

National Climatic Data Center

DATA DOCUMENTATION

FOR

DATA SET 1129 (DSI-1129)

Marine Data

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1. **Abstract:** From 1983-85 a joint project was undertaken to collect all available marine data sets of reasonable quality and combine them into one database. Members of the joint project included the National Climatic Data Center (NCDC), Environmental Research Laboratory (ERL), National Center for Atmospheric Research (NCAR) and Cooperative Institute for Research in Environmental Sciences (CIRES). The latter three participants are located in Boulder, Colorado and are referred to collectively as the Boulder Group in this document. The Boulder Group has produced several data files and statistical summaries for the period 1854-1979. The set of products is known as the [Comprehensive Ocean-Atmosphere Data Set](#) (COADS).

One of the COADS products is a unique set of marine observations in 1129 format for 1970-79 and in a modified 1129 format for 1854-1969. Known data problems have been corrected and most duplicate observations removed. The set includes most the NCDC marine data files, including the 70's Decade data, and data from other sources. The modified format for pre-70's data contains supplemental and additional data fields determined by source deck number. Originally, marine data were received or stored on computer cards. Each card deck was assigned a number to define the data source. Source deck numbers were retained when storage media changed and have been used to indicate general data quality. The DSI-1100 Reference Manual describes data formats according to source deck number.

The period of record of the current database includes the years 1854 through the present. Data received at the NCDC after 1982 are in 1129 format regardless of data year. Users requesting marine data from the NCDC will receive 1129 formatted data for 1970 through the present year. The COADS data will be provided for 1970-79 unless the user specifies a different set. Pre-1970's data will be provided from the COADS set in modified 1129 format. The modified 1129 format is the same as 1129 for data positions 1-78 and 125-140. Data positions 79-124 and 141-148 contain supplemental data fields which are unique for each deck number. Documentation for the pre-1970 marine data is available in the Marine Data Users Reference, 1854-1969.

2. **Element Names and Definitions:**

Data Element Definitions

Table 1: Data Included in the Surface Marine Data Set

Standard Format Codes 1129

Table 2 gives the standard 1129 format and element description for marine data archived for 1970 through the present time. Formats for data prior to 1970 are given in the DSI-11 Reference Manual for the Atlas data or in the Marine Data Users Reference, 1854-1969.

ELEMENT: SOURCE DECK Number

RECORD POSITION: 01-03

DEFINITION: Number of the source deck from which the observations came.

MINIMUM: 000

MAXIMUM: 999

Decks with beginning dates of 1970 may be valid for years prior to 1970. See

COADS Release 1, TABLE F1-1, for the entire period of record by source deck.

Source	Source Deck	Period of Record (Month/Year)
Pacific Marine Environmental Lab (PMEL).....	143	01/75 - 12/77
USSR Ice Island Observations.....	186	01/70 - 12/70
Gulf Offshore Weather Observing Network (GOWON)...	500	01/82 - 12/82
Monterey-Fleet Numerical Oceanography Center.....	555	01/70 - 06/73
Tuna Boats.....	666	03/71 - 05/75
First GARP Global Experiment (FGGE).....	849-850	12/78 - 11/79
NOAA Data Buoy Center (NDBC)*		
Drifting Buoys.....	875	11/84 -
Fixed Buoys.....	876-882	01/70 -
C-MAN.....	882	03/83 -
Global Telecommunications		
Global Weather Central (AFGWC).....	888	01/73 - 12/81
AUTODIN (US Navy Ships).....	889	01/73
National Meteorological Center (NMC):		
NMC, Source Code not defined.....	890	01/80
NMC Ship Data.....	892	01/80
NMC Fixed Buoy Data.....	893	01/80
NMC Drifting Buoy Data.....	894	01/80
NMC Coastal Marine Stations, Other		
Land Stations and Light Ships.....	895	01/80
NMC OSV, MARS and Other Sources.....	896	01/80
National Oceanographic Data Center (NODC).....	891	01/70 - 06/77
Japanese.....	898 (119)	01/70 - 04/74
Australian.....	900	01/70 - 12/79
WMO Foreign Exchange Data (IMM).....	926-927	01/70
Great Lakes Manuscript.....	927	01/70
US Merchant Manuscript.....	927	01/70
US Navy Manuscript.....	927	01/70 - 12/79
Ocean Station Vessel (OSV).....	928 (926)	01/70 - 12/79

Beginning in 1980, WMO foreign exchange data were assigned source deck 926, regardless of data year. Some OSV data have also been assigned to deck 926.

* Complete records of NDBC data are stored in DSI-1171. Observation from fixed and drifting buoys and C-MAN stations are available at lower time resolution (generally 3-hourly) in the 1129 file from NMC or after COADS updates.

ELEMENT: MARSDEN SQ
RECORD POSITION: 04-06
DEFINITION: Marsden Square system
MINIMUM: 001
MAXIMUM: 936

ELEMENT: MARSDEN SUB-SQ.
RECORD POSITION: 07-08
DEFINITION: Marsden Square system
MINIMUM: 00
MAXIMUM: 99

Missing = 99

ELEMENT: QUADRANT
RECORD POSITION: 09
DEFINITION:

1 = N Latitude and W Longitude
2 = N Latitude and E Longitude
3 = S Latitude and W Longitude
4 = S Latitude and E Longitude

MINIMUM: 1
MAXIMUM: 4

ELEMENT: LATITUDE
RECORD POSITION: 10-12
DEFINITION: 00.0° - 90.0° North or South
MINIMUM: 000
MAXIMUM: 999
Missing = 999

ELEMENT: LONGITUDE
RECORD POSITION: 13-16
DEFINITION: 000.0° - 180.0° East or West
MINIMUM: 0000
MAXIMUM: 1800

ELEMENT: YEAR
RECORD POSITION: 17-20
DEFINITION:
MINIMUM: 19xx
MAXIMUM: 20xx

ELEMENT: MONTH
RECORD POSITION: 21-22
DEFINITION:

01 = January	07 = July
02 = February	08 = August
03 = March	09 = September
04 = April	10 = October
05 = May	11 = November
06 = June	12 = December

MINIMUM: 01
MAXIMUM: 12

ELEMENT: DAY
RECORD POSITION: 23-24
DEFINITION: Day of the month
MINIMUM: 01
MAXIMUM: 31

ELEMENT: HOUR

RECORD POSITION: 25-26
DEFINITION: 0000 GMT - 2300 GMT
MINIMUM: 00
MAXIMUM: 23

ELEMENT: WIND DIR INDICATOR
RECORD POSITION: 27
DEFINITION:

b = 36 point scale
0 = 32 point scale
1 = 16 of 36 point scale
2 = 16 of 32 point scale

MINIMUM: b
MAXIMUM: 2

ELEMENT: WIND DIRECTION
RECORD POSITION: 28-29
DEFINITION: Direction from which the wind is blowing.
MINIMUM: 00
MAXIMUM: 36
Missing = 99

ELEMENT: WIND SPEED INDICATOR
RECORD POSITION: 30
DEFINITION:
MINIMUM: b
MAXIMUM: 0

ELEMENT: WIND SPEED
RECORD POSITION: 31-33
DEFINITION: Wind speed at the surface in knots.
MINIMUM: 000
MAXIMUM: 199
000 = Calm

ELEMENT: VISIBILITY INDICATOR
RECORD POSITION: 34
DEFINITION:
MINIMUM: 0
MAXIMUM: 1

b = Not measured
0 = Measured
1 = Fog present

ELEMENT: VISIBILITY
RECORD POSITION: 35-36
DEFINITION: Horizontal visibility at the surface in kilometers.
MINIMUM: 90
MAXIMUM: 99

NOTE: When Visibility Indicator = 1, and Visibility = 93, it means that Fog

was present and visibility was not reported.

90 = <0.05 NOTE:
91 = 0.05
92 = 0.2
93 = 0.5
94 = 1
95 = 2
96 = 4
97 = 10
98 = 20
99 = 50 or more

ELEMENT: PRESENT WEATHER

RECORD POSITION: 37-38

DEFINITION:

MINIMUM: 00

MAXIMUM: 99

00 = Cloud development not observed.
01 = Clouds generally dissolving or becoming less developed.
02 = State of the sky unchanged.
03 = Clouds generally forming or developing.
04 = Visibility reduced by smoke.
05 = Haze
06 = Widespread dust in suspension in the air, not raised by wind, at or near the station at the time of observation.
07 = Dust or sand raised by wind at or near the station at the time of observation, but no well developed dust whirls or sand whirls and no duststorm or sandstorm seen.
08 = Well developed dust whirls or sand whirls seen at or near the station during the preceding hour or at the time of observation, but no duststorm or sandstorm.
09 = Duststorm or sandstorm within sight at the time of observation, or at the station during the preceding hour.
10 = Light fog (visibility 1,100 yards or more). Synonymous with European term "Mist".
11 = Patches of shallow fog or ice fog at the station, not deeper than about 10 meters.
12 = More or less continuous shallow fog or ice fog at the station, not deeper than about 10 meters.
13 = Lightning visible, no thunder heard.
14 = Precipitation within sight, not reaching the surface of the sea.
15 = Precipitation within sight, reaching the surface of the sea, but more than 5 km. from the ship.
16 = Precipitation within sight, reaching the surface of the sea, near to, but not at the ship.
17 = Thunderstorm, but no precipitation at the time of observation.
18 = Squalls at or within sight of the ship during the preceding hour or at the time of observation.
19 = Funnel cloud or Waterspout at or within sight of the ship during the preceding hour or at the time of observation.

The following phenomena occurred at the ship during the preceding hour but not at the time of observation.

- 20 = Drizzle (not freezing) or snow grains.
- 21 = Rain (not freezing).
- 22 = Snow
- 23 = Rain and snow or ice pellets, type (a).
- 24 = Freezing drizzle or freezing rain.
- 25 = Shower(s) of rain.
- 26 = Shower(s) of snow or of rain and snow.
- 27 = Shower(s) of hail (ice pellets, type (b), snow pellets), or of rain and hail (ice pellets, type (b), snow pellets).
- 28 = Fog or ice fog.
- 29 = Thunderstorm (with or without precipitation).

Present weather codes 30-99 refer to phenomena occurring at the ship at time of observation.

- 30 = Slight or moderate duststorm or sandstorm has decreased during the preceding hour.
- 31 = Slight or moderate duststorm or sandstorm, no appreciable change during the preceding hour.
- 32 = Slight or moderate duststorm or sandstorm has begun or has increased during the preceding hour.
- 33 = Severe duststorm or sandstorm has decreased during the preceding hour.
- 34 = Severe duststorm or sandstorm, no appreciable change during the preceding hour.
- 35 = Severe duststorm or sandstorm has begun or has increased during the preceding hour.
- 36 = Slight or moderate drifting snow generally low (below eye level) less than 6 feet.
- 37 = Heavy drifting snow generally low (below eye level) less than 6 feet.
- 38 = Slight or moderate blowing snow generally high (above eye level) 6 feet or more.
- 39 = Heavy blowing snow generally high (above eye level) 6 feet or more.
- 40 = Fog or ice fog at a distance at the time of observation, but not at the ship during the preceding hour, the fog or ice fog extending to a level above that of the observer.
- 41 = Fog or ice fog in patches.
- 42 = Fog or ice fog, sky visible has become thinner during the preceding hour.
- 43 = Fog or ice fog, sky invisible has become thinner during the preceding hour.
- 44 = Fog or ice fog, sky visible no appreciable change during the preceding hour.
- 45 = Fog or ice fog, sky invisible no appreciable change during the preceding hour.
- 46 = Fog or ice fog, sky visible has begun or has become thicker during the preceding hour.
- 47 = Fog or ice fog, sky invisible has begun or has become thicker during the preceding hour.
- 48 = Fog, depositing rime, sky visible.
- 49 = Fog, depositing rime, sky invisible.
- 50 = Drizzle, not freezing, intermittent slight at time of observation.
- 51 = Drizzle, not freezing, continuous slight at time of observation.
- 52 = Drizzle, not freezing, intermittent moderate at time of observation.
- 53 = Drizzle, not freezing, continuous moderate at time of observation.

54 = Drizzle, not freezing, intermittent heavy (dense) at time of observation.
 55 = Drizzle, not freezing, continuous heavy (dense) at time of observation.
 56 = Drizzle, freezing, slight.
 57 = Drizzle, freezing, moderate or heavy (dense).
 58 = Drizzle and rain, slight.
 59 = Drizzle and rain, moderate or heavy.
 60 = Rain, not freezing, intermittent, slight at time of observation.
 61 = Rain, not freezing, continuous, slight at time of observation.
 62 = Rain, not freezing, intermittent, moderate at time of observation.
 63 = Rain, not freezing, continuous, moderate at time of observation.
 64 = Rain, not freezing, intermittent, heavy at time of observation.
 65 = Rain, not freezing, continuous, heavy at time of observation.
 66 = Rain, freezing, slight.
 67 = Rain, freezing, moderate or heavy.
 68 = Rain or drizzle and snow, slight.
 69 = Rain or drizzle and snow, moderate or heavy.
 70 = Intermittent fall of snowflakes.
 71 = Continuous fall of snowflakes slight at time of observation.
 72 = Intermittent fall of snowflakes moderate at time of observation.
 73 = Continuous fall of snowflakes moderate at time of observation.
 74 = Intermittent fall of snowflakes heavy at time of observation.
 75 = Continuous fall of snowflakes heavy at time of observation.
 76 = Ice prisms (with or without fog).
 77 = Snow grains (with or without fog).
 78 = Isolated starlike snow crystals (with or without fog).
 79 = Ice pellets, type (a) (sleet, U.S. definition).
 80 = Rain shower(s), slight.
 81 = Rain shower(s), moderate or heavy.
 82 = Rain shower(s), violent.
 83 = Shower(s) of rain and snow mixed, slight.
 84 = Shower(s) or rain and snow mixed, moderate or heavy.
 85 = Snow shower(s), slight.
 86 = Snow shower(s), moderate or heavy.
 87 = Slight showers of snow pellets or ice pellets, type (b), with or without rain or rain and snow mixed.
 88 = Moderate or heavy showers of snow pellets or ice pellets (b), with or without rain or rain and snow mixed.
 89 = Slight showers of hail with or without rain or rain and snow mixed, not associated with thunder.
 90 = Moderate or heavy showers of hail, with or without rain or rain and snow, slight mixed, not associated with thunder.
 91 = Slight rain at time of observation, thunderstorm during preceding hour but not at observation.
 92 = Moderate or heavy rain at time of observation, thunderstorm during preceding hour but not at observation.
 93 = Slight snow, or rain and snow mixed or hail, at time of observation with thunderstorm during the preceding hour but not at time of observation.
 94 = Moderate or heavy snow, or rain and snow mixed, or hail, at time of observation with thunderstorm during the preceding hour but not at time of observation.
 95 = Thunderstorm, slight or moderate, without hail, but with rain and/or snow at time of observation.
 96 = Thunderstorm, slight or moderate, with hail at time of observation.
 97 = Thunderstorm, heavy, without hail but with rain and/or snow at time

- of observation.
98 = Thunderstorm combined with duststorm or sandstorm at time of observation.
99 = Thunderstorm, heavy, with hail at time of observation.

PAST WEATHER 0-9

(The period covered by Past Weather is 6 hours for observations at 0000, 0600, 1200, and 1800 GMT and 3 hours 0300, 0900, 1500, and 2100 GMT).

- 0 = Cloud covering 1/2 or less of the sky throughout the appropriate period.
1 = Cloud covering more than 1/2 of sky during part of the appropriate period and covering 1/2 or less during part of the period.
2 = Cloud covering more than 1/2 of the sky for observations at sky throughout the appropriate period.
3 = Sandstorm, duststorm or blowing snow.
4 = Fog or ice fog or thick haze (U.S. includes thick smoke).
5 = Drizzle
6 = Rain
7 = Snow, or rain and snow mixed.
8 = Shower
9 = Thunderstorm with or without precipitation.

ELEMENT: SEA LEVEL PRESSURE

RECORD POSITION: 40-44

DEFINITION:

MINIMUM: 08900

MAXIMUM: 10700

SCALING FACTOR: 890.0-1070.0 millibars

ELEMENT: TEMPS INDICATOR

RECORD POSITION: 45

DEFINITION: ACCURACY OF ORIGINAL TEMPERATURE VALUE

MINIMUM: b

MAXIMUM: 5

- b = Unknown
1 = Tenths of degrees Celsius
3 = Whole degrees Celsius
5 = Half degrees Celsius

NOTE: Original temperature values in Fahrenheit are converted to tenths of degrees Celsius and assigned a code value of 1.

ELEMENT: AIR TEMPERATURE

RECORD POSITION: 46-49

DEFINITION:

MINIMUM: +000

MAXIMUM: +999

00.0-+99.9°C (always recorded to tenths). The first position in the field is the sign.

ELEMENT: WET BULB TEMPERATURE

RECORD POSITION: 50-53

DEFINITION:

MINIMUM: +000

MAXIMUM: +999

00.0-+99.9°C (always recorded to tenths). The first position in the field is the sign.

ELEMENT: DEW POINT TEMPERATURE

RECORD POSITION: 54-57

DEFINITION:

MINIMUM: +000

MAXIMUM: +999

00.0-+99.9°C (always recorded to tenths). The first position in the field is the sign. Dew-point temperature is generally reported in whole degrees. A zero is recorded in the tenths position when dew-points are reported in whole degrees.

ELEMENT: SEA SURFACE TEMPERATURE

RECORD POSITION: 58-61

DEFINITION:

MINIMUM: +000

MAXIMUM: +999

00.0-+99.9°C (always recorded to tenths). The first position in the field is the sign.

ELEMENT: TOTAL CLOUD AMT. (N)

RECORD POSITION: 62

DEFINITION: Fraction of celestial dome covered by all clouds

MINIMUM: 0

MAXIMUM: 9

0 = Clear

1 = 1 Okta or less, but not zero

2-8 = 2-8 Oktas

9 = Sky obscured or cloud amount cannot be estimated

ELEMENT: LOWER CLOUD AMT. (N_h)

RECORD POSITION: 63

DEFINITION: Fraction of celestial dome covered by all the C_L clouds and, if no C_L cloud is present, that fraction covered by all the C_M clouds present. See codes for Total Cloud Amt. (N).

MINIMUM: 0

MAXIMUM: 9

ELEMENT: LOW CLOUD TYPE (C_L)

RECORD POSITION: 64

DEFINITION:

MINIMUM: 0

MAXIMUM: -

0 = No Stratocumulus, Stratus, Cumulus or Cumulonimbus.

1 = Cumulus with little vertical extent and seemingly flattened, or ragged

- Cumulus other than of bad weather, or both.
- 2 = Cumulus of moderate or strong vertical extent, generally with protuberances in the form of domes or towers, either accompanied or not by other Cumulus or by Stratocumulus, all having their base at the same level.
 - 3 = Cumulonimbus, the summits of which, at least partially, lack sharp outlines but are neither clearly fibrous (cirriform) nor in the form of an anvil; Cumulus, Stratocumulus or Stratus may also be present.
 - 4 = Stratocumulus formed by the spreading out of Cumulus; Cumulus may also be present.
 - 5 = Stratocumulus not resulting from the spreading out of Cumulus.
 - 6 = Stratus in a more or less continuous sheet or layer, or in ragged shreds, or both, but no Stratus fractus of bad weather.
 - 7 = Stratus fractus of bad weather (generally existing during precipitation and a short time before and after) or Cumulus fractus of bad weather, or both (pannus), usually below Altostratus or Nimbostratus.
 - 8 = Cumulus and Stratocumulus other than that formed from the spreading out of Cumulus; the base of the Cumulus is at a different level from that of the Stratocumulus.
 - 9 = Cumulonimbus, the upper part of which is clearly fibrous (cirriform), often in the form of an anvil; either accompanied or not by Cumulonimbus without anvil or fibrous upper part by Cumulus, Stratocumulus, Stratus or pannus.
 - = Stratocumulus, Stratus, Cumulus and Cumulonimbus invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena.

ELEMENT: CLOUD HGT. INDICATOR

RECORD POSITION: 65

DEFINITION:

MINIMUM: b

MAXIMUM: 0

b = Height not measured

0 = Height measured

ELEMENT: CLOUD HEIGHT (h)

RECORD POSITION: 66

DEFINITION: Height above sea surface of the base of the lowest cloud or fragment thereof.

MINIMUM: 0

MAXIMUM: 9

<u>Approximate Height in Feet</u>	<u>Height in Meters</u>
0 = 0-149	0-49
1 = 150-299	50-99
2 = 300-599	100-199
3 = 600-999	200-299
4 = 1000-1999	300-599
5 = 2000-3499	600-999
6 = 3500-4999	1000-1499
7 = 5000-6499	1500-1999
8 = 6500-7999	2000-2499
9 = >8000 or	>2500 or

no clouds no clouds
- = missing

ELEMENT: MID. CLOUD TYPE (C_M)

RECORD POSITION: 67

DEFINITION:

MINIMUM: 0

MAXIMUM: 9

- 0 = No Altostratus, Altostratus or Nimbostratus.
- 1 = Altostratus, the greater part of which is semi-transparent; through this part the sun or moon may be weakly visible, as through ground glass.
- 2 = Altostratus, the greater part of which is sufficiently dense to hide the sun or moon, or Nimbostratus.
- 3 = Altostratus, the greater part of which is semi-transparent; the various elements of the cloud change only slowly and are all at a single level.
- 4 = Patches (often in the form of almonds or fishes) of Altostratus, the greater part of which is semi-transparent; the clouds occur at one or more levels and the elements are continually changing in appearance.
- 5 = Semi-transparent Altostratus in bands, or Altostratus in one or more fairly continuous layers (semi-transparent or opaque), progressively invading sky; these Altostratus clouds generally thicken as a whole.
- 6 = Altostratus resulting from the spreading out of Cumulus (or Cumulonimbus).
- 7 = Altostratus in two or more layers, usually opaque in places, and not progressively invading the sky; or opaque layer of Altostratus, not progressively invading the sky; or Altostratus together with Altostratus or Nimbostratus.
- 8 = Altostratus with sproutings in the form of small towers or battlements; or Altostratus having the appearance of cumuliform tufts.
- 9 = Altostratus of a chaotic sky, generally at several levels.
- = Altostratus, Altostratus and Nimbostratus invisible owing to darkness, fog, blowing dust or sand or other similar phenomena, or more often because of the presence of a continuous layer of lower clouds.

ELEMENT: HIGH CLOUD TYPE (C_H)

RECORD POSITION: 68

DEFINITION:

MINIMUM: 0

MAXIMUM: 9

- 0 = No Cirrus, Cirrocumulus or Cirrostratus
- 1 = Cirrus in the form of filaments, strands or hooks, not progressively invading sky.
- 2 = Dense Cirrus, in patches or entangled sheaves, which usually do not increase and sometimes seem to be the remains of the upper part of a Cumulonimbus; or Cirrus with sproutings in the form of small turrets or battlements, or Cirrus having the appearance of cumuliform tufts.
- 3 = Dense Cirrus, often in the form of an anvil, being the remains of the upper parts of Cumulonimbus.
- 4 = Cirrus in the form of hooks or of filaments, or both, progressively invading the sky; they generally become denser as a whole.
- 5 = Cirrus (often in bands converging towards one point or two opposite points of the horizon) and Cirrostratus, or Cirrostratus alone; in either case, they are progressively invading the sky, and generally growing denser as a whole, but the continuous veil does not reach 45 degrees above the horizon.

- 6 = Cirrus (often in bands converging towards one point or two opposite points of the horizon) and Cirrostratus, or Cirrostratus alone; in either case, they are progressively invading the sky, and generally growing denser as a whole; the continuous veil extends more than 45 degrees above the horizon, without the sky being totally covered.
- 7 = Veil of Cirrostratus covering the celestial dome.
- 8 = Cirrostratus not progressively invading the sky and not completely covering the celestial dome.
- 9 = Cirrocumulus alone, or Cirrocumulus accompanied by Cirrus or both, but Cirrocumulus is predominant. Cirrostratus, invisible owing to darkness, fog, blowing dust or sand or other similar phenomena, or more often because of the presence of a continuous layer of lower clouds.
- = Cirrus, Cirrocumulus and Cirrostratus.

ELEMENT: DIRECTION OF WAVES

RECORD POSITION: 69-70

DEFINITION: Direction from which waves come, in tens of degrees

MINIMUM: 00

MAXIMUM: 99

00 = Calm	19 = 185-194°
01 = 005-014°	20 = 195-204°
02 = 015-024°	21 = 205-214°
03 = 025-034°	22 = 215-224°
04 = 035-044°	23 = 225-234°
05 = 045-054°	24 = 235-244°
06 = 055-064°	25 = 245-254°
07 = 065-074°	26 = 255-264°
08 = 075-084°	27 = 265-274°
09 = 085-094°	28 = 275-284°
10 = 095-104°	29 = 285-294°
11 = 105-114°	30 = 295-304°
12 = 115-124°	31 = 305-314°
13 = 125-134°	32 = 315-324°
14 = 135-144°	33 = 325-334°
15 = 145-154°	34 = 335-344°
16 = 155-164°	35 = 345-354°
17 = 165-174°	36 = 355-004°
18 = 175-184°	

49 = Waves confused, direction indeterminate (waves equal to or less than 4 3/4 meters).

99 = Waves confused, direction indeterminate (waves greater than 4 3/4 meters).

For Buoy data this field is average wave direction.

ELEMENT: PERIOD OF WAVES

RECORD POSITION: 71

DEFINITION:

MINIMUM: 0

MAXIMUM: 9

2 =	5 seconds or less
3 =	6- 7 seconds

4 = 8- 9 seconds
 5 = 10-11 seconds
 6 = 12-13 seconds
 7 = 14-15 seconds
 8 = 16-17 seconds
 9 = 18-19 seconds
 0 = 20-21 seconds
 1 = over 21 seconds
 - = calm or period not determined

For Buoy data this field is average wave period.

ELEMENT: HEIGHT OF WAVES
RECORD POSITION: 72-73
DEFINITION: Height in 1/2 meter increments
MINIMUM: 00
MAXIMUM: 99

00 = < 1/4 meter
 01-99 = 1/2 - 49 1/2 meters

For Buoy data this field is significant wave height.

ELEMENT: DIRECTION OF SWELL
RECORD POSITION: 74-75
DEFINITION:
MINIMUM: 00
MAXIMUM: 36

00 = Calm	19 = 185-194°
01 = 005-014°	20 = 195-204°
02 = 015-024°	21 = 205-214°
03 = 025-034°	22 = 215-224°
04 = 035-044°	23 = 225-234°
05 = 045-054°	24 = 235-244°
06 = 055-064°	25 = 245-254°
07 = 065-074°	26 = 255-264°
08 = 075-084°	27 = 265-274°
09 = 085-094°	28 = 275-284°
10 = 095-104°	29 = 285-294°
11 = 105-114°	30 = 295-304°
12 = 115-124°	31 = 305-314°
13 = 125-134°	32 = 315-324°
14 = 135-144°	33 = 325-334°
15 = 145-154°	34 = 335-344°
16 = 155-164°	35 = 345-354°
17 = 165-174°	36 = 355-004°
18 = 175-184°	

49 = Waves confused, direction indeterminate (waves equal to or less than 4 3/4 meters).

99 = Waves confused, direction indeterminate (waves greater than

ELEMENT: PERIOD OF SWELL
RECORD POSITION: 76

DEFINITION:**MINIMUM:****MAXIMUM:**

Same as Period of Waves prior to 1968

2 = 5 seconds or less
3 = 6- 7 seconds
4 = 8- 9 seconds
5 = 10-11 seconds
6 = 12-13 seconds
7 = 14-15 seconds
8 = 16-17 seconds
9 = 18-19 seconds
0 = 20-21 seconds
1 = over 21 seconds
- = calm or period not determined

Beginning January 1, 1968, the code for Period of Swell is:

0 = 10 seconds
1 = 11 seconds
2 = 12 seconds
3 = 13 seconds
4 = 14 seconds or more
5 = 5 seconds or less
6 = 6 seconds
7 = 7 seconds
8 = 8 seconds
9 = 9 seconds
- = calm or period not determined

ELEMENT: HEIGHT OF SWELL

RECORD POSITION: 77-78

DEFINITION:

MINIMUM: 00

MAXIMUM: 99

00 = < 1/4 meter
01-99 = 1/2 - 49 1/2 meters

ELEMENT: COUNTRY CODE

RECORD POSITION: 79-80

DEFINITION:

	RECRUITING		
	<u>COUNTRY</u>		
	<u>CODES</u>		
Netherlands	0b }b	00	
Norway	0J }J	01	
USA	0K }K	02	
UK	0L }L	03	
France	0M }M	04	
Denmark	0N }N	05	
Italy	0O }O	06	

India	0P	}P	07
Hong Kong	0Q	}Q	08
New Zealand	0R	}R	09
Ireland	1b	Jb	10
Philippines	1J	JJ	11
Egypt	1K	JK	12
Canada	1L	JL	13
Belgium	1M	JM	14
South Africa	1N	JN	15
Australia	1O	JO	16
Japan	1P	JP	17
Pakistan	1Q	JQ	18
Argentina	1R	JR	19
Sweden	2b	Kb	20
Fed Rep Ger	2J	KJ	21
Iceland	2K	KK	22
Israel	2L	KL	23
Malaysia	2M	KM	24
USSR	2N	KN	25
Finland	2O	KO	26
Rep of Korea	2P	KP	27
New Caledonia	2Q	KQ	28
Portugal	2R	KR	29
Spain	3b	Lb	30
Thailand	3J	LJ	31
Yugoslavia	3K	LK	32
Poland	3L	LL	33
Brazil	3M	LM	34
Singapore	3N	LN	35
Kenya	3O	LO	36
Tanzania	3P	LP	37
Uganda	3Q	LQ	38
Mexico	3R	LR	39
Ger.Dem.Rep	4b	Mb	40

A right brace (}) may print as a blank on some printers. Country codes prior to 1982 may have an X overpunch (non-numeric character) in one or both record positions. An X overpunch in 79 indicates foreign receipt and in 80 indicates an auxiliary ship.

ELEMENT: SHIP DIRECTION

RECORD POSITION: 81

DEFINITION: Ship's course (true) made good during the 3 hours preceding the time of observation.

MINIMUM: 0

MAXIMUM: 9

0 = Ship hove to	5 = SW
1 = NE	6 = W
2 = E	7 = NW
3 = SE	8 = N
4 = S	9 = Unknown

ELEMENT: SHIP SPEED

RECORD POSITION: 82

DEFINITION: Ship's average speed made good during the 3 hours preceding the

time of observation.

MINIMUM: 0

MAXIMUM: 9

Prior to 1968:

0 = 0 knots	5 = 13-15 knots
1 = 1- 3 knots	6 = 16-18 knots
2 = 4- 6 knots	7 = 19-21 knots
3 = 7- 9 knots	8 = 22-24 knots
4 = 10-12 knots	9 = > 24 knots

Beginning January 1, 1968:

0 = 0 knots	5 = 21-25 knots
1 = 1- 5 knots	6 = 26-30 knots
2 = 6-10 knots	7 = 31-35 knots
3 = 11-15 knots	8 = 36-40 knots
4 = 16-20 knots	9 = > 40 knots

ELEMENT: BAROMETRIC TENDENCY

RECORD POSITION: 83

DEFINITION:

MINIMUM: 0

MAXIMUM: 8

- 0 = Increasing, then decreasing; atmospheric pressure same or higher than 3 hours ago.
- 1 = Increasing, then steady; or increasing then increasing more slowly; atmospheric pressure now higher than 3 hours ago.
- 2 = Increasing (steadily or unsteadily) atmospheric pressure now higher than 3 hours ago.
- 3 = Decreasing or steady, then increasing; or increasing then increasing more rapidly; atmospheric pressure now higher than 3 hours ago.
- 4 = Steady; atmospheric pressure same as 3 hours ago.
- 5 = Decreasing, then increasing; atmospheric pressure the same or lower than 3 hours ago.
- 6 = Decreasing, then steady, or decreasing then decreasing more slowly; atmospheric pressure now lower than 3 hours ago.
- 7 = Decreasing (steadily or unsteadily) atmospheric pressure now lower than 3 hours ago.
- 8 = Steady or increasing, then decreasing; or decreasing then decreasing more rapidly; atmospheric pressure now lower than 3 hours ago.

ELEMENT: AMOUNT OF PRESSURE CHANGE

RECORD POSITION: 84-86

DEFINITION: Amount of pressure change from 3 hours ago. (Tenths of millibars)

MINIMUM: 000

MAXIMUM: 299

00.0-29.9 millibars

ELEMENT: TYPE OF ICE ACCRETION ON SHIP

RECORD POSITION: 87

DEFINITION:

MINIMUM: 1

MAXIMUM: 5

- 1 = Icing from ocean spray
- 2 = Icing from fog
- 3 = Icing from spray and fog
- 4 = Icing from rain
- 5 = Icing from spray and rain

ELEMENT: ICE THICKNESS ON SHIP

RECORD POSITION: 88-89

DEFINITION: Ice thickness in centimeters

MINIMUM: 00

MAXIMUM: 99

ELEMENT: RATE OF ICE ACCRETION

RECORD POSITION: 90

DEFINITION:

MINIMUM: 0

MAXIMUM: 4

- 0 = Ice not building up
- 1 = Ice building up slowly
- 2 = Ice building up rapidly
- 3 = Ice melting or breaking up slowly
- 4 = Ice melting or breaking up rapidly

ELEMENT: SHIP, OSV, OR BUOY CALL SIGN OR NUMBER*

RECORD POSITION: 91-97

DEFINITION: Identification of individual ship, Ocean Station Vessel, or buoy.

MINIMUM:

MAXIMUM:

Ship numbers can vary from 4 to 7 characters, consisting of mixed alphanumerics. OSV identification prior to July 1975 varied from 4YA to 4YZ. Then it changed from C7A to C7Z. Buoy numbers are 5 digit numerics.

ELEMENT: ORIGINAL WIND SPEED UNITS INDICATOR

RECORD POSITION: 98

DEFINITION:

MINIMUM:

MAXIMUM:

- b = not reported
- 1 = knots
- 2 = meters per second

ELEMENT: ORIGINAL TEMPERATURE UNITS INDICATOR

RECORD POSITION: 99

DEFINITION:

MINIMUM:

MAXIMUM:

- b = not reported

- 1 = °C (Celsius) to tenths
- 2 = °F (Fahrenheit) to tenths
- 3 = Whole °C
- 4 = Whole °F
- 5 = Halves of °C
- 6 = Halves of °F
- 7 = °F to tenths, and dew point to whole F
- 8 = °C to tenths, and dew point to whole °C

ELEMENT: SEA TEMPERATURE METHOD INDICATOR

RECORD POSITION: 100

DEFINITION:

MINIMUM:

MAXIMUM:

- b = Method unknown (Beginning in 1982)
- 0-7 Prior to 1982 indicated intake or unknown
- I = Intake method
- B = Bucket method

For internationally exchanged data (IMMT) beginning in 1982 and all data after September 1985.

- 0 = Bucket thermometer
- 1 = Condenser inlet (intake)
- 2 = Trailing thermistor
- 3 = Hull contact sensor
- 4 = Through hull sensor
- 5 = Radiation thermometer
- 6 = Bait tanks thermometer
- 7 = Others
- 8 = Method unknown

* All call signs or numbers begin in position 91; i.e., the element is left justified. In some cases, particularly for buoy numbers, the rightmost positions may be 0 or blank filled.

ELEMENT: PERIOD OF WAVES

RECORD POSITION: 101-102

DEFINITION: Period of wind waves in seconds.

MINIMUM: 00

MAXIMUM: 99

ELEMENT: PERIOD OF SWELL

RECORD POSITION: 103-104

DEFINITION: Period of swell in seconds.

MINIMUM: 00

MAXIMUM: 99

ELEMENT: DESCRIPTION OF ICE TYPE

RECORD POSITION: 105

DEFINITION:

MINIMUM: 0

MAXIMUM: 9

- 0 = No ice
- 1 = New ice
(PRIOR TO 1982)
- 2 = Fast ice
- 3 = Pack or drift ice
- 4 = Packed slush
- 5 = Shore lead
- 6 = Heavy fast ice
- 7 = Heavy pack or drift ice
- 8 = Hummocked ice
- 9 = Icebergs

ELEMENT: CONCENTRATION OF ICE (NEW CODE 1982)

RECORD POSITION: 105

DEFINITION:

MINIMUM:

MAXIMUM:

- 0 = No sea ice in sight
- 1 = Ship in open lead more than 1.0 nautical mile wide, or ship in fast ice with boundary beyond limit of visibility
- 2 = Sea ice present in concentrations less than 3/10 (3/8), open water or very open pack ice
- 3 = 4/10 to 6/10 (3/8 to less than 6/8), open pack ice
- 4 = 7/10 to 8/10 (6/8 to less than 7/8), close pack ice
- 5 = 9/10 or more, but not 10/10 (7/8 to less than 8/8), very close pack ice
- 6 = Strips and patches of pack ice with open water between
- 7 = Strips and patches of close or very close pack ice with areas of lesser concentration between
- 8 = Fast ice with open water, very open or open pack ice to seaward of the ice boundary
- 9 = Fast ice with close or very close pack ice to seaward of the ice boundary
- = Unable to report, because of darkness, lack of visibility, or because ship is more than 0.5 nautical mile away from ice edge

ELEMENT: EFFECT OF THE ICE ON NAVIGATION(PRIOR TO 1982)

RECORD POSITION: 106

DEFINITION:

MINIMUM: 0

MAXIMUM: 9

- 0 = Navigation unobstructed
- 1 = Navigation unobstructed for steamers, difficult for sail
- 2 = Navigation difficult for low powered steamers
- 3 = Navigation possible only for powerful steamers
- 4 = Navigation possible only for ships reinforced against ice
- 5 = Navigation possible with assistance of ice breakers
- 6 = Channel open in the solid ice
- 7 = Navigation temporarily closed
- 8 = Navigation closed
- 9 = Navigation conditions unknown (e.g., owing to bad weather)

ELEMENT: STAGE OF ICE DEVELOPMENT

RECORD POSITION: 106

DEFINITION:

MINIMUM:

MAXIMUM:

(NEW CODE 1982)

- 0 = New ice only (frazil ice, grease ice, slush, shuga)
- 1 = Nilas or ice rind, less than 10 cm thick
- 2 = Young ice (grey ice, grey-white ice), 10-30 cm thick
- 3 = Predominantly new and/or young ice with some first-year ice
- 4 = Predominantly thin first-year ice with some new and/or young ice
- 5 = All thin first-year ice (30-70 cm thick)
- 6 = Predominantly medium first-year ice (70-120 cm thick) and thick first-year ice (> 120 cm thick) with some thinner (younger) first-year ice
- 7 = All medium and thick first-year ice
- 8 = Predominantly medium and thick first-year ice with some old ice (usually more than 2 meters thick)
- 9 = Predominantly old ice
- = Unable to report, because of darkness, lack of visibility or because only ice of land origin is visible or because ship is more than 0.5 nautical mile away from ice edge.

ELEMENT: BEARING OF PRINCIPAL ICE EDGE FROM SHIP (PRIOR TO 1982)

RECORD POSITION: 107

DEFINITION:

MINIMUM: 0

MAXIMUM: 9

- 0 = No ice edge can be stated
- 1 = Edge toward NE
- 2 = Edge toward E
- 3 = Edge toward SE
- 4 = Edge toward S
- 5 = Edge toward SW
- 6 = Edge toward W
- 7 = Edge toward NW
- 8 = Edge toward N
- 9 = Edge in several directions

ELEMENT: ICE OF LAND ORIGIN (NEW CODE 1982)

RECORD POSITION: 107

DEFINITION:

MINIMUM:

MAXIMUM:

- 0 = No ice of land origin
- 1 = 1-5 icebergs, no growlers or bergy bits
- 2 = 6-10 icebergs, no growlers or bergy bits
- 3 = 11-20 icebergs, no growlers or bergy bits
- 4 = Up to and including 10 growlers with bergy bits -- no icebergs
- 5 = More than 10 growlers and bergy bits -- no icebergs
- 6 = 1-5 icebergs with growlers and bergy bits
- 7 = 6-10 icebergs with growlers and bergy bits
- 8 = 11-20 icebergs with growlers and bergy bits
- 9 = More than 20 icebergs with growlers and bergy bits -- a major hazard to navigation

- = Unable to report, because of darkness, lack of visibility or because only sea ice is visible

ELEMENT: DISTANCE TO ICE EDGE FROM SHIP (PRIOR TO 1982)

RECORD POSITION: 108

DEFINITION:

MINIMUM: 0

MAXIMUM: 9

- 0 = Up to 1 mi.
- 1 = 1 to 2 mi.
- 2 = 2 to 4 mi.
- 3 = 4 to 6 mi.
- 4 = 6 to 8 mi.
- 5 = 8 to 12 mi.
- 6 = 12 to 16 mi.
- 7 = 16 to 20 mi.
- 8 = More than 20 mi.
- 9 = Unspecified or no observations

ELEMENT: BEARING OF PRINCIPAL ICE EDGE FROM SHIP (NEW CODE 1982)

RECORD POSITION: 108

DEFINITION:

MINIMUM:

MAXIMUM:

- 0 = Ship in shore or flaw lead
- 1 = Principal ice edge towards NE
- 2 = Principal ice edge towards E
- 3 = Principal ice edge towards SE
- 4 = Principal ice edge towards S
- 5 = Principal ice edge towards SW
- 6 = Principal ice edge towards W
- 7 = Principal ice edge towards NW
- 8 = Principal ice edge towards N
- 9 = Not determined (ship in ice)
- = Unable to report, because of darkness, lack of visibility or because only ice of land origin is visible

ELEMENT: ORIENTATION OF ICE EDGE (PRIOR TO 1982)

RECORD POSITION: 109

DEFINITION:

MINIMUM: 0

MAXIMUM: 9

- 0 = Unknown-ship outside ice
- 1 = NE to SW, ice to the NW
- 2 = E to W, ice to the N
- 3 = SE to NW, ice to the NE
- 4 = S to N, ice to the E
- 5 = SW to NE, ice to the SE
- 6 = W to E, ice to the S
- 7 = NW to SE, ice to the SW
- 8 = N to S, ice to the W
- 9 = Unknown-ship inside ice

ELEMENT: SITUATION OR TREND

RECORD POSITION: 109

DEFINITION:

MINIMUM:

MAXIMUM:

Conditions over previous 3 hours

- 0 = Ship in open water with floating ice in sight
- 1 = Ship in easily penetrable ice; conditions improving
- 2 = Ship in easily penetrable ice; conditions not changing
- 3 = Ship in easily penetrable ice; conditions worsening
- 4 = Ship in ice difficult to penetrate; conditions improving
- 5 = Ship in ice difficult to penetrate; conditions not changing
- 6 = Ice forming and floes freezing together
- 7 = Ice under slight pressure
- 8 = Ice under moderate or severe pressure
- 9 = Ship beset
- = Unable to report--because of darkness or lack of visibility

ELEMENT: AMOUNT OF PRECIPITATION

RECORD POSITION: 110-112

DEFINITION: precipitation in millimeters, preceding the time of observation

MINIMUM: 000

MAXIMUM: 999

- | | |
|------|----------------|
| 000 | Not used |
| 001 | 1 mm |
| 002 | 2 mm |
| etc. | etc. |
| 988 | 988 mm |
| 989 | 989 mm or more |
| 990 | Trace |
| 991 | 0.1 mm |
| 992 | 0.2 mm |
| 993 | 0.3 mm |
| 994 | 0.4 mm |
| 995 | 0.5 mm |
| 996 | 0.6 mm |
| 997 | 0.7 mm |
| 998 | 0.8 mm |
| 999 | 0.9 mm |

From WMO Manual No. 306, Manual on Codes, Code Table 3590

Beginning May 1998, this information is no longer decoded and is blank filled.

ELEMENT: DURATION OF PERIOD OF REFERENCE FOR AMOUNT OF PRECIPITATION

RECORD POSITION: 113-113

DEFINITION:

MINIMUM: 0

MAXIMUM: 9

- | | |
|---|---|
| 1 | Total precipitation during the 6 hours preceding the observation |
| 2 | Total precipitation during the 12 hours preceding the observation |
| 3 | Total precipitation during the 18 hours preceding the observation |
| 4 | Total precipitation during the 24 hours preceding the observation |

5	Total precipitation during the	1 hours preceding the observation
6	Total precipitation during the	2 hours preceding the observation
7	Total precipitation during the	3 hours preceding the observation
8	Total precipitation during the	9 hours preceding the observation
9	Total precipitation during the	15 hours preceding the observation
0	The duration of the period of reference is not covered by table or the period does not end at the time of the report	

From WMO Manual No. 306, Manual on Codes, Code Table 4019
Beginning May 1998, this information is no longer decoded and is blank filled.

ELEMENT: SIGNIFICANT CLOUD AMOUNT

RECORD POSITION: 114

DEFINITION: Amount of individual cloud layer or mass

MINIMUM: 0

MAXIMUM: 9

0	= Clear
1	= 1 Okta or less, but not zero
2-8	= 2-8 Oktas
9	= Sky obscured or cloud amount cannot be estimated

ELEMENT: SIGNIFICANT CLOUD TYPE

RECORD POSITION: 115

DEFINITION: Cloud genus

MINIMUM:

MAXIMUM:

0	= Cirrus
1	= Cirrocumulus
2	= Cirrostratus
3	= Altocumulus
4	= Altostratus
5	= Nimbostratus
6	= Stratocumulus
7	= Stratus
8	= Cumulus
9	= Cumulonimbus
-	= Cloud not visible owing to darkness, fog, duststorms, sandstorm, or other analogous phenomena.

ELEMENT: SIGNIFICANT CLOUD HEIGHT

RECORD POSITION: 115-117

DEFINITION: Height of the base of the cloud layer or mass whose genus was
reported in Field 045.

MINIMUM:

MAXIMUM:

00	= < 30 meters
01-50	= 30-1,500 meters in increments of 30 meters
56-80	= 1,800-9,000 meters in increments of 300 meters
81-88	= 10,500-21,000 meters in increments of 1,500 meters
89	= > 21,000 meters
90	= < 50 meters
91	= 50-100 meters
92	= 100-200 meters

93 = 200-300 meters
 94 = 300-600 meters
 95 = 600-1,000 meters
 96 = 1,000-1,500 meters
 97 = 1,500-2,000 meters
 98 = 2,000-2,500 meters
 99 = >2,500 meters or no clouds

ELEMENT: SECOND MOST SIGNIFICANT PAST WEATHER
RECORD POSITION: 118
DEFINITION: Same as Past Weather
MINIMUM: 0
MAXIMUM: 9

ELEMENT: SECOND MOST SIGNIFICANT SWELL DIRECTION

RECORD POSITION: 119-120
DEFINITION: Same as Direction of Waves
MINIMUM:
MAXIMUM:

ELEMENT: SECOND MOST SIGNIFICANT SWELL PERIOD
RECORD POSITION: 121-122
DEFINITION: Period of Swell in seconds
MINIMUM: 00
MAXIMUM: 99

ELEMENT: SECOND MOST SIGNIFICANT SWELL HEIGHT
RECORD POSITION: 123-124
DEFINITION: Same as Height of Waves
MINIMUM: 00
MAXIMUM: 99

ELEMENT: QUALITY CONTROL FLAGS
RECORD POSITION: 125-138
DEFINITION:
MINIMUM:
MAXIMUM:

125 = SHIP POSITION
 126 = WIND
 127 = VISIBILITY
 128 = PRESENT WEATHER
 129 = PAST WEATHER
 130 = PRESSURE
 131 = DRY BULB
 132 = WET BULB
 133 = DEW POINT
 134 = SEA TEMPERATURE
 135 = CLOUDS
 136 = WAVES
 137 = SWELL WAVES
 138 = AMOUNT OF PRESSURE TENDENCY (ppp)

ELEMENT: QUALITY CODE (QC)

RECORD POSITION: 139-140

DEFINITION:

MINIMUM: 00

MAXIMUM: 39

The following are the flagged values and their quality codes:

<u>Flag</u>	<u>Quality Code</u>
R	0
A, B	1
J, K, L	2
M, N, Q, S	3

ELEMENT: QC DATE

RECORD POSITION: 141-144

DEFINITION: QC date is the year and month the quality control program was run on the data. It serves to document changes and is for NCDC use only.

The International Maritime Meteorological Tape (IMMT) format was implemented by the WMO in 1982. Record positions 135-146 are meaningful for decks 926 and 500 received after 1982.

MINIMUM:

MAXIMUM:

ELEMENT: IMMT WAVE MEASUREMENT

RECORD POSITION: 145

DEFINITION:

MINIMUM: 0

MAXIMUM: 9

- 0 = Wave and swell estimated
- 1 = Wave and swell measured (Wave Recorder)
- 2 = Wave measured (Wave Recorder) and swell estimated
- 3 = Other combinations of measured and estimated (Wave Recorder)
- 4 = Wave and swell measured (Buoy)
- 5 = Wave measured (Buoy) and swell estimated
- 6 = Other combinations of measured and estimated (Buoy)

Other Measurement System:

- 7 = Wave and swell measured
- 8 = Wave measured and swell estimated
- 9 = Other combinations of measured and estimated

ELEMENT: IMMT OBSERVATION PLATFORM

RECORD POSITION: 146

DEFINITION:

MINIMUM: 0

MAXIMUM: 9

- 0 = Unknown
- 1 = Selected Ship
- 2 = Supplementary Ship

- 3 = Auxiliary Ship
- 4 = Automated station/data buoy
- 5 = Fixed sea station
- 6 = Coastal station
- 7 = Aircraft
- 8 = Satellite
- 9 = Others

ELEMENT: QUALITY CODE INDICATOR

RECORD POSITION: 147

DEFINITION:

MINIMUM: 0

MAXIMUM: 9

- 0 = No quality control (QC) performed
- 1 = Manual QC only
- 2 = Automated QC only (no time-sequence checks)
- 3 = Automated QC only (including time-sequence checks)
- 4 = Manual and Automated QC (superficial; no automated time-sequence checks)
- 5 = Manual and Automated AC (superficial; including time-sequence checks)
- 6 = Manual and Automated QC (intensive; including time-sequence checks)
- 7 = Not used
- 8 = Not used
- 9 = National system of QC (information to be furnished to WMO)

The i_x indicator was initiated with 1982 WMO code change.

ELEMENT: WEATHER OPERATION TYPE AND PAST AND PRESENT WEATHER INDICATOR (i_x)

RECORD POSITION: 148

DEFINITION:

MINIMUM: 1

MAXIMUM: 6

Station Operation	Weather Group 7ww W ₁ W ₂
1 = Manned	Included
2 = Manned	Omitted (no significant weather to report)
3 = Manned	Omitted (not observed, data not available)
4 = Automatic	Included
5 = Automatic	Omitted (no significant weather to report)
6 = Automatic	Omitted (not observed, data not available)

Characters in the data record other than those specified in this table may occur. These are retained as original data and should be considered missing (e.g., 9, 1, or blank may occur for telecommunicated observations in record position 148).

Temperature Indicators

There are 2 temperature indicators in the 1129 format. Position 45 indicates that temperature data in 1129 format are recorded in Celsius degrees. The precision of the original input data is also indicated. For example, a temperature indicator 3 (position 45) means original data were recorded to whole degrees in Celsius. If the original value were 25°C, the 1129 value

would be 25.0°C.

Position 99 is the original temperature units indicator and identifies the scale and precision of the original data. Indicator codes 1, 3, and 5 (Celsius) are the same for positions 45 and 99. Original units indicator codes 2, 4, 6, 7, 8 are converted to tenths of degrees Celsius in 1129 and position 45 is set to 1.

A.2 Codes

Most of the codes used in the marine processing system and 1129 format are according to WMO regulations. Exceptions are quadrant, the use of a minus sign (-) in all cases were WMO uses a solidus (/) and quality control flags. Codes used in 1129 format are given in Table 2.

A.3 Flags (NCDC Quality Indicators)

The quality control computer program automatically assigns flags for missing, suspect and erroneous data elements. In 1129 format, flags are located in record positions 125-138. Marine observations are checked for illegal codes, internal consistency, time continuity and extreme values. Original values are not changed. Flags assigned are:

<u>Errors</u>	<u>Systematic or Bias Error</u>	<u>Suspect</u>	<u>Erroneous</u>
Illegal Code	A*		M
Internal Consistency	B	J	N
Time Continuity		K	
Extreme Value		L	Q

* For cloud fields, flag A indicates cloud types, cloud height, total cloud and/or low cloud amount have failed the internal consistency check.

In checking an element for exceeding a reasonable value, climatic data consisting of means and standard deviations were derived using 5° latitude-longitude squares which contained at least 25 observations. Standard deviations were computed for air, wet-bulb, dew-point and sea temperature, and sea level pressure. If a value lies outside $\bar{X} \pm 4.8$ standard deviations, it is flagged suspect. If the value lies outside $\bar{X} \pm 5.8$ standard deviations, it is flagged erroneous. A flagged element which is flagged again as a result of a second test retains the flag indicating the highest severity. A flagged element is not used in determining if another element should be flagged. Elements accepted as correct are flagged R and missing elements are flagged S.

The ship position flag is set to M when the latitude exceeds 90.0° or the longitude exceeds 180.0°. All numeric fields are flagged M when non-numeric characters occur. Ship call, year, month, day and hour are compared and when these elements are equal for 2 or more observations but the latitude and longitude differ, the ship positions are flagged K. Positions on land, land-locked data, are flagged M.

"Time continuity checks (track checks) are performed on temperature (wet bulb, dry bulb, dew point, sea surface), pressure and position. When questionable data are encountered, it is often difficult to determine exactly which data in the series are in error. Because the check is performed sequentially and the

K flag is set based on the value of the immediately preceeding record, the K flag will not precisely identify the questionable element in all cases. The K flag indicates that one or more observations preceeding or following the flagged observation in time sequence may be in error. The flagged observation may or may not be in error. A R flag may indicate that no track check was possible and the element was accepted as reported."

3. **Start Date:** 18540101

4. **Stop Date:** On going.

5. **Coverage:** Global.

- a. Southernmost Latitude: 90S
- b. Northernmost Latitude: 90N
- c. Westernmost Longitude: 180W
- d. Easternmost Longitude: 180E

6. **How to Order Data:**

Ask NCDC's Climate Services about costs of obtaining this data set.
Phone 828-271-4800
Fax 828-271-4876
E-mail: NCDC.Orders@noaa.gov

7. **Archiving Data Center:**

National Climatic Data Center/NCDC
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001
Phone 828-271-4800

8. **Technical Contact:**

National Climatic Data Center/NCDC
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001
Phone: 828-271-4800

9. **Known Uncorrected Problems:** Errors and discrepancies in the marine database are present because of the varying quality of the input sources, changes in observing practices, coding practices and data processing procedures throughout the history of data collection. Users of marine data should examine the element flags and be aware of known discrepancies in certain source decks before selecting observations for research projects. Whenever possible or economically practical, known errors or discrepancies have been corrected in the data files. The 1129 data from 1970 to the present and the COADS data have been reviewed extensively and most errors have been corrected. COADS data for the 1970 decade replaced the 70's Decade data in the archive. Pre-1970 COADS data are provided to users unless they specify a different data set when ordering.

10. **Quality Statement:** The marine database is a compilation of reports from a wide range of sources. Observations have been obtained from ship logs,

weather reporting forms, publications, automated observing platforms, global telecommunication circuits, foreign meteorological services and scientific research projects. The quality of instruments ranges from those found aboard 19th century shipping to sophisticated electronic equipment aboard today's research vessels. Observer qualifications vary from deck hand to trained meteorologist.

The data quality of marine records is highly variable and dependent on the data source and year of receipt. The NCDC retains the original observation in most cases and flags the erroneous or suspect data element. The data have been processed under various editing routines throughout the years. All data for 1970 to the present have been passed through this edit or a similar version used to produce the COADS data set. Data for the 1854-1969 period were also re-edited during the COADS project. (See COADS Release 1 for details.)

11. **Essential Companion Datasets:** None.

12. **References:** None listed in original documentation.